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Genetic resources *Genomics* & Plant biotechnology

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Plant-parasite *interactions*

prospects for integrated pest management

Ever-increasing consumer demands for quality food and preservation of the environment mean that solutions must be found to the new constraints on agriculture. It is crucial to develop methods that limit the use of phytosanitary treatments, and to encourage use of alternative approaches such as varietal resistance to diseases and pests. These research activities should be paralleled by development of decision-making aids.

Team and co-ordinator

The "Biology and Genetics of Plant-Parasite Interactions for Integrated Protection" research group (UMR BGPI) comprises 25 researchers from Agro.M, Cirad and INRA.

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The Biology and Genetics of Plant-Parasite Interactions for Integrated Control (BGPI) research group is developing novel approaches to **integrated pest management** through improved combinations of biocontrol methods. We aim to enhance understanding of plant-parasite interactions in terms of the underlying mechanisms and at the population level. Basic research on suitable models are yielding approaches and tools that allow progress in:

- **population genetics,**
- **genetics of interactions,**
- mathematical modelling of population fluctuations. •••

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Blast damage evaluation in a rice trial, with a resistant variety (center row) and susceptible varieties (side rows)

The Rice-*Magnaporthe grisea* pathosystem as a research model

Rice blast caused by *Magnaporthe grisea* is the most important fungal disease of rice, and greatly limits production, particularly in Latin America. The resistance of a new variety is in general quickly overcome by the pathogen, and the cost of fungicides is prohibitive for most rice growers.

Rice blast is a research model for numerous international research teams. A large collection of isolates has been assembled and is used in studies of *M. grisea* population structures and their evolution. This work has been conducted at different levels: worldwide, European, Chinese and fertile populations of Asia.

The mechanisms of interaction have also been studied. New resistance and virulence genes have been mapped. In a collaboration with an Aventis-CNRS (National Centre for Scientific Research) research group, one of the avirulence genes has been cloned, and others are now being studied. The cloning of a resistance gene is currently under way. Genomics is now being used to identify and clone genes involved in the defence mechanisms of rice.

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